
PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Reestablish Safe Access Into Tributaries Of The Yakima Subbasin.

BPA project number: 9803400

Contract renewal date (mm/yyyy): 12/1999 ☒ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Yakama Indian Nation - Fisheries Resources Program

Business acronym (if appropriate) YIN

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses
7.6A.2, Policy 7.6B.3, and Policy 7.8E.1.

FWS/NMFS Biological Opinion Number(s) which this project addresses
N/A

Other planning document references

1. Wy Kan Ush Me Wa Kish Wit, pages 58, 59 and 3-20.
 2. Policy of Washington Department of Fish and Wildlife and Western Washington Treaty Tribes Concerning Wild Salmonids, December 5, 1997, Policy Statement #14.
 3. Yakima River Watershed Council, a 20/20 vision for a viable Future of the Water Resource of the Yakima River Basin, Draft of October 1997, page 64.
 4. Memoranda of Agreement with several private landowners.
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Short description

Reconnect over 100 miles of habitat in ten tributaries that have adequate flow, by building fishways and screens at human-made barriers. Protect reaccessed habitat through fencing and property purchase.

Target species

Spring and fall chinook salmon, coho salmon, summer steelhead, and resident trout.

Section 2. Sorting and evaluation**Subbasin**

Yakima

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input checked="" type="checkbox"/> Anadromous fish <input type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Multi-year (milestone-based evaluation) <input checked="" type="checkbox"/> Watershed project evaluation	<input checked="" type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input type="checkbox"/> Research & monitoring <input type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description
20547	Yakima Subbasin Habitat/Watershed Project Umbrella
9206200	Yakama Nation Riparian/Wetlands Restoration
9603501	Satus Watershed Restoration
9803300	Restore Upper Toppenish Creek Watershed
9705300	Toppenish-Simcoe Instream Flow Restoration and Assessment
9705100	Yakima Basin Side Channels
9803400	Reestablish Safe Access into Trib's of the Yakima Subbasin (this proposal)
9901300	Ahtanum Creek Watershed Assessment
9705000	Little Naches Riparian and In-Channel Restoration

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
96064	Wilson Creek Riparian Restoration	This project provided barrier survey, MOU's with key private landowners,

		and extensive public outreach

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1998	Gained additional cost-share funding for fishway construction	none

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Reestablish juvenile salmonid passage into at least eight additional miles of habitat in the lower Wilson/Naneum drainage.	a	Subcontract engineering design work with currently approved cost-share funding from the eastern Washington Regional Fisheries Enhancement Group.
		b	Construct a total of 5 fishways and 5 irrigation diversion screens.
2	Conduct field surveys to identify passage barriers and unscreened diversions in ten tributaries of the Yakima River	a	Collect maps, ownership information, formulate data sheets.
		b	Obtain permission to access private properties.
		c	Conduct field surveys.
3	Complete reports on the conclusions from the barrier and diversion surveys.	a	Develop draft barrier reports, circulate to other resource managers for review.
		b	Modify draft based upon input from other managers, adopt final version.
		c	Circulate final reports to BPA, other resource managers, and interested parties.

4	Formulate construction plan to remedy passage problems. Develop recommendations based on cost/benefit analysis from survey reports.	a	Run calculations on cost per unit habitat gained for fishway construction at alternate sites.
		b	Collect input from other fish managers on findings of report.
		c	Finalize fishway and screen construction plan.
5	Construct fishways at migration barriers and reliable screens at gravity-fed diversions in ten tributaries, to regain more than 100 miles of habitat.	a	secure all applicable permits.
		b	Draft statements of work, circulate to contractors, receive bids, award contracts.
		c	Begin construction
6	Protect into perpetuity the most productive riparian and instream habitats in the reaccessed streams through conservation easement and property purchase. Protect habitat from improper grazing through fencing.	a	Develop tentative list of purchases and fencing projects based upon risk of permanent habitat loss, and current/potential habitat function.
		b	Contact landowners to solicit involvement, based upon willing seller-willing buyer approach.
		c	From list of interested sellers, develop MOA's with each to initiate the appraisal and hazardous materials assessment process.
		d	Compare funding limitations to amount of potential habitat to acquire under different scenarios.
		e	If necessary, conduct Habitat Evaluation Procedures to prioritize parcels for purchase.
		f	Finalize purchases and construct fences.
7	Monitor results of constructing fishways and screens.	a	Conduct snorkel, beach seine and/or electrofishing surveys in treated tributaries, utilizing mark/recapture population survey methodologies, to

			help determine project efficacy.
		b	Conduct redd surveys in treated tributaries to help determine project efficacy.
		c	If necessary, conduct statistical analysis on smolt outmigration numbers at the Chandler juvenile facility to attempt to quantify project benefits.
8	Present progress and results of project efforts.	a	Prepare and submit reports to BPA. Periodically post findings on the web.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	2/1999	1/2000	Yes	X	0.00%
2	2/1999	11/1999			0.00%
3	9/1999	12/1999		X	0.00%
4	12/1999	12/1999			0.00%
5	1/2000	10/2005	Yes	X	78.00%
6	6/1999	10/2005	Yes	X	20.00%
7	9/1999	11/2005	Yes	X	1.00%
8	3/1999	12/2005			1.00%
				Total	100.00%

Schedule constraints

Time constraints may occur from permitting delays, coordination with private landowners, construction season limitations and subcontractor schedules.

Completion date

FY 2005

Section 5. Budget

FY99 project budget (BPA obligated): \$100,000

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	One FTE Bio II	%5	35,985

Fringe benefits	25.3% rate	% 1	9,104
Supplies, materials, non-expendable property	Hip boots, computer software, film developing, maps, miscellaneous supplies	% 0	3,400
Operations & maintenance	Rental Vehicles, vehicle insurance, cell phones, miscellaneous field gear	% 2	16,688
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Conservation easements, land purchase	% 13	100,000
NEPA costs	SEPA, Shorelines and Hydraulics permitting,	% 0	1,000
Construction-related support	Engineering	% 1	10,500
PIT tags	# of tags:	% 0	
Travel		% 0	2,500
Indirect costs	23.5% rate	% 6	48,241
Subcontractor	Property surveys	% 1	9,000
Subcontractor	Property appraisals	% 1	10,500
Subcontractor	Fishway and Screen Construction	% 65	500,000
Subcontractor	Legal Services	% 3	25,000
Other		% 0	
TOTAL BPA FY2000 BUDGET REQUEST			\$771,918

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
Eastern Washington Regional Fisheries Enhancement Group	engineering	% 1	10,000
		% 0	
		% 0	
		% 0	
Total project cost (including BPA portion)			\$781,918

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	\$780,000	\$789,000	\$796,000	\$804,000

Section 6. References

Watershed?	Reference
<input type="checkbox"/>	Columbia River Intertribal Fisheries Commission. 1995. Wy Kan Ush Me Wa Kish Wit.
<input type="checkbox"/>	Washington Department of Fish and Wildlife. 1997. Policy of Washington Department of Fish and Wildlife and Western Washington Treaty Tribes Concerning Wild Salmonids.
<input type="checkbox"/>	Yakima River Watershed Council, a 20/20 Vision for a viable future of the water resource of the Yakima River Basin, Draft of October 1997
<input checked="" type="checkbox"/>	Confederated Tribes and Bands of the Yakima Indian Nation, Washington Department of Fisheries, and Washington Department of Wildlife. 1990. Yakima River Subbasin Plan. Columbia Basin Fish and Wildlife Authority.
<input type="checkbox"/>	Eitemiller, D., H. Fraser, A. Sullivan & M. Uebelacker. 1995. Traditional Resource Patterns in the Upper Yakima River Basin. Geography Department, Central Washington University for Yakima Resource Management Cooperative, Ellensburg Washington.
<input type="checkbox"/>	Koch, G. 1996. Cowiche Creek Riparian Zone Restoration Project Final Report. Submitted to the Environmental Protection Agency. Yakama Nation Fisheries Resources Program.
<input type="checkbox"/>	Harvester, P. December 1997. Personal Communication.
<input type="checkbox"/>	Pearsons, T., G. McMichael, S. Martin, E. Bartrand, M. Fischer, S. Leider. 1994. Yakima River Species Interactions Studies. Annual Report 1994. DOE-BP-99852, Bonneville Power Administration, Portland, Oregon.
<input type="checkbox"/>	Easterbrooks, J. November 1997. Personal Communication.

PART II - NARRATIVE

Section 7. Abstract

Items to be funded include the following:

In project year #2-

1. Systematic implementation of fishway and screen construction plan developed from barrier survey report compiled in year #1. Tributary habitat will thus be reconnected to the Yakima River, starting in the areas where the greatest amount of habitat can be regained for the least amount of money.
2. Additional tributary habitat protection through fencing of roughly 9 miles of riparian habitat, and/or conservation easement or property purchase of roughly 40 acres of floodplain.

The project would continue in years #3 through #6 as in year #2, and would complete the action recommendations of the barrier survey report produced in year #1.

The project goal is to rebuild Yakima River spring and fall chinook, coho and steelhead populations. Project objectives include establishing safe passage into tributary habitats that have artificial barriers at or near their confluence. **The target tributaries do not**

have chronic instream flow problems, and they historically provided several hundred miles of habitat for anadromous species. **At present, a collective total of only 11 miles remains accessible**, due to human-made migration barriers, typically formed by irrigation diversion structures.

Target tributaries have tremendous rearing potential in comparison to the mainstem. Many miles of tributary habitat still expresses healthy channel sinuosity, width/depth ratios, and thermally benign winter temperatures due to groundwater inflow. The mainstem Yakima's hydrograph is regulated to convey irrigation water, e.g. flows are too high during summer releases, and too low during the winter to provide optimal rearing habitat.

Due to the rapid conversion of many streamside properties from commercial agriculture to suburban development, the project will also allocate \$90,000/year to habitat protection through property acquisition, conservation easements and fencing. Thus this project also intends to "**protect the best**" from permanent alteration.

The project is relevant to the 1994 Columbia Basin Fish and Wildlife program in that it will contribute to the protection and restoration of anadromous fish stocks in the Yakima Basin. Reconnecting functional habitat is an important component of the fish restoration effort. Providing greater habitat quantity and diversity in the watershed are the main products of this project. The project will also protect terrestrial wildlife species through riparian habitat fencing, and purchase of conservation easements and/or property title.

The project is based upon the scientific principle that reconnecting more than 100 miles of productive tributary habitat to the mainstem, when only eleven miles can be accessed currently, will contribute to the rebuilding of natural Yakima River salmon and steelhead stocks. Rebuilding the natural run is the overarching goal of the Yakima Klickitat Fisheries Production Facility. Tributary habitat reconnection in streams that do not currently have chronic instream flow problems is the main objective of this project. The final product will be reconnection of more than 100 miles of tributary habitat to the mainstem by the end of FY 2005.

Fishway construction will provide access into habitats that are currently blocked, thus no anadromous fish are currently present in the project area. Because project monitoring will typically start with zero fish of any of the target stocks as the baseline, only very basic monitoring is proposed. Snorkel or seining surveys, and possibly coho and/or steelhead redd surveys will be undertaken at index sites in some of the reconnected tributaries. Fish screen performance will be monitored through observation.

Section 8. Project description

a. Technical and/or scientific background

The highest priority in the Yakima Basin is to reverse the downward-spiraling trend of the remaining anadromous fish populations. Through planning for the Yakima Klickitat Fisheries Production Facility, countless hours have been expended on planning and construction, in an effort to meet this priority. To rebuild the fisheries resource, **reconnecting over 100 miles of tributary habitat, as would occur through this proposal**, provides a critical step in the rebuilding process.

Tributaries of the Yakima River historically provided possibly thousands of miles of productive spawning and rearing habitat for five species of salmon and summer steelhead. Irrigation development has created physical barriers that have effectively blocked all but the extreme lower end of many tributaries. While some tributaries are dewatered during portions of the irrigation season, **this proposal focuses on restoring access into those tributaries that do not have chronic instream flow problems**. A total of ten tributaries, representing well over 200 miles of potential anadromous fish habitat, have adequate flow to support anadromous rearing and spawning production during much or all of the year. For example, the Wilson/Naneum watershed historically provided well over one hundred miles of spawning and rearing habitat. Today, although instream flow is typically adequate, human-made barriers – in the form of low-head diversion dams, **have blocked migration to all but the lower six miles of this system**. During population surveys, fish managers have found densities of chinook parr in the lower reaches of these two creeks to be higher than most other areas in the basin (Easterbrooks, 1997; Pearson et. al., 1994). The evidence suggests that establishment of safe passage above these barriers would greatly increase rearing habitat potential in the basin, suggesting a greater egg to smolt survival, on beneficial biological outcome.

The impact of the loss of tributary spawning/rearing habitat is exacerbated by the reduction in rearing habitat function in the mainstem Yakima. Throughout the summer the Yakima is managed to convey irrigation water. Seasonal flows are much higher than normal in the upper 105 River Miles, and mainstem-rearing chinook and steelhead fry are often unable to find suitable habitats. During the winter, reservoir releases are kept to a minimum, with flows too low for optimal rearing. Many side channels and alcoves become isolated or dewatered altogether, while others become too shallow to provide functional rearing habitat. Riparian vegetation is often unable to grow close enough to the stream channel to provide over-hanging cover through the winter months. The impact of river regulation also affects salmonid food sources.

The result is a reduction in mainstem rearing habitat quantity and quality throughout the year. Thus, the need to reestablish tributary passage is a priority, due to the altered mainstem flow, and the amount of tributary habitat that is currently blocked. This project will reestablish access to more than 100 miles of spawning and rearing habitat. This is equivalent to 2 the length of the Yakima mainstem!

Mitigation for losses will occur in place, by both removal of illegal barriers and construction of juvenile and adult fishways over legal barriers. Irrigation screens will be

constructed at gravity-fed diversion points that would otherwise entrain and kill fish. Habitat protection in the form of property and/or easement purchase, and fencing will also occur along some treated channels.

During conceptual planning for the project, ten tributaries were selected that have barriers near their confluence, and that have adequate instream flow to support juvenile rearing habitat. Three of these streams may experience instream flow problems during drought years, in their lower reaches, and typically late in the irrigation season. However, even during droughts these streams would pass juveniles into intact, forested reaches above the uppermost diversion structure, because flow is adequate for migration during the bulk of the migration season. In each of these tributaries, well over 80% of their historic anadromous zone is above or below the flow-limited zone.

All ten tributaries fail to support anadromous fish because human-made migration barriers exist near their downstream terminus. Candidate tributaries are described below, starting from the headwaters of the Yakima mainstem and working toward its confluence with the Naches River and from the Naches headwaters to the mouth of the Yakima:

- 1. Tucker Creek:** This creek enters the Yakima mainstem at River Mile (RM) 200. It has at least one unscreened diversion, and at least one seasonal barrier near the mouth. Channel gradient, and floodplain confinement in the lower one Creek Mile (CM) is extremely low. Riparian habitat is excellent. The mouth of Tucker Creek lies in the middle of the AEaston Reach of the Yakima mainstem, where roughly 60% of the subbasin spring chinook spawn currently.
- 2. Manastash Creek:** This creek enters the Yakima mainstem at RM 155, and has a drainage area of over 75 square miles. It has been extensively altered through irrigation development. Currently, anadromous fry/parr passage is blocked at CM 1.4. The second barrier is located near CM 3.4. The upper human-made barrier occurs at CM 5.1. Above that point, perhaps **as many as 20 miles of rearing/spawning habitat exists**, that is functionally much more intact than rearing habitat in the mainstem Yakima.
- 3. Reecer Creek:** This creek enters the Yakima River at RM 154. Although excellent rearing habitat occurs along the lower portions of the drainage, a seasonal migration barrier immediately above the mouth precludes juvenile access. One unscreened diversion lies immediately above the barrier. An undetermined number of migration barriers and unscreened diversions lie above this point.
- 4. Wilson Creek and associated tributaries:** Wilson Creek and its attendant tributaries enter the Yakima River at RM 147, with **a collective drainage area of 382 square miles**. All the tributaries have been altered through agricultural practices, including channelization, soil runoff, grazing, and irrigation diversion. However, juvenile rearing densities below the barriers are high relative to the rest of the basin (Pearsons, et. al., 1994). Implementation of this project will **increase the amount of rearing habitat available by at least twenty miles, and possibly as high as seventy miles**.

a. Wilson Creek: This stream has been extensively altered through irrigation development. Currently, chinook fry/parr rearing occurs up to CM 1.8, where the first irrigation barrier lies. Densities of juvenile chinook are high relative to the rest of the basin throughout a large portion of the year. Channel gradient and floodplain confinement are extremely low for the next six miles above the first barrier. Channel sinuosity is relatively high. A barrier survey up to CM 8 found one permanent barrier and two seasonal barriers, with an additional seasonal barrier that has not been used for three years. Five unscreened diversions with high potential for entrainment were found. The west branch of Wilson Creek flows into the main channel at CM 4.9, with only one barrier and no diversions found in the lower mile of the west branch. Sediment levels are low in this system. Because of the channel shape, gradient, and high water quality, fish managers believe the rearing habitat potential in this system is extremely high.

b. Naneum Creek: This stream enters Wilson Creek at CM 1.6. The west branch has three seasonal barriers in the lower 1.3 CM=s, with four unscreened diversions in this reach. Channelization and consequent entrenchment have limited habitat complexity. Riparian conditions vary from good to poor; the east branch of Naneum Creek has extremely high densities of chinook fry/parr in the lower 1.9 CM=s (Easterbrooks, 1997).

c. Coleman Creek: This stream enters Naneum Creek at CM 1.0. The first migration barrier is permanent, and is located at CM 0.7. The second and third barriers are seasonal and lie at CM 1.0 and CM 2.0, respectively. Six unscreened diversions are located between the first and third migration barrier. Riparian conditions within the study reach are considered good.

d. Cherry Creek: This channelized, highly entrenched stream enters Wilson Creek at CM 1.0. The first migration barrier is permanent at CM 1.4. Barrier and unscreened diversion surveys were not conducted above the first barrier, because habitat function above the barrier is of extremely low value due to siltation, channelization and grazing.

e. Badger Creek: Again, this stream is channelized, highly entrenched and has high silt loads. It joins Cherry Creek at CM 0.4, with the first permanent migration barrier at CM 0.6. Barrier and unscreened diversion surveys were not conducted above the first barrier.

5. Cowiche Creek: This tributary enters the lower Naches River at RM 3, and it has a drainage area of 120 square miles. An irrigation structure immediately above the mouth blocks upstream juvenile chinook passage. Adult chinook access is problematic because an irrigation diversion ditch from the Naches River flows through Cowiche Creek, which shunts virtually all Cowiche water down the irrigation ditch. The change in water chemistry at the mouth of Cowiche Creek severely reduces olfactory attraction for adult fish seeking their natal stream. Perhaps as much as **30 miles of potential habitat lies above the downstream barrier**, much of which is heavily forested, with multiple beaver dam complexes, stable flow, and outstanding riparian habitat.

6. Wide Hollow Creek: This tributary has a drainage area of 65 square miles entering the Yakima mainstem at RM 107. A grain mill flume at CM 0.4 formed a permanent barrier until 1989, when a fishway was constructed for the migration of adult salmon. However, the fishway **does not provide passage for juvenile salmonids**. A seasonal barrier lies at approximately CM 3.2. A similar seasonal barrier exists at CM 4.6. No other barriers exist up to approximately CM 13, where flows become seasonal in drought years (Harvester, 1997). Water temperature in lower Wide Hollow Creek is much more benign than in the Yakima mainstem during winter months, and juvenile salmonids occur below the first migration barrier in very high densities during this period (author, personal observation). Riparian habitat conditions vary tremendously, however pacific willow climax communities are prevalent in many locations.

7. Blue Slough: This is a remnant side channel of the Yakima mainstem. Fish access it from both the upstream and downstream ends. Rearing habitat potential is high, however access from the downstream end is periodically blocked by seasonal diversion structures. Roughly 12 to 15 irrigation diversions occur along the channel, but few are expected to have approved surface water rights under the Acquavella adjudication process (Harvester, 1997). Similar to Wide Hollow Creek, Blue Slough is deemed a high priority for rearing habitat restoration, because that reach of the Yakima mainstem immediately below the lower end of this side channel has lethal temperatures during much or all of the summer. Blue Slough and Wide Hollow are seen as the *Alast chance* for summer rearing chinook fry.

8, 9. Spring & Snipes Creeks: Both creeks enter the Yakima at RM 42 and have a collective drainage area of 50 square miles. Spring Creek has a migration barrier three miles above the mouth. In general, the primary habitat problem is riparian clearing and grazing. The channels are incised, so few gravity-fed unscreened diversions occur, however several dams exist that form full migration barriers.

10. Corral Creek: This channel enters the Yakima mainstem at RM 34. Habitat conditions are similar to Spring and Snipes Creeks, with few unscreened gravity diversions but profound riparian impacts. Steelhead, and perhaps coho, used Corral Creek for spawning as recently as 20 years ago; juvenile fall chinook continue to rear in the lower end.

The ten streams described above reflect hundreds of miles of rearing and spawning habitat that **typically has adequate flow under current conditions, but is unutilized due to artificial barriers near the confluence**. Under current conditions, cumulatively only eleven miles of rearing habitat is available in all of these tributaries combined. The ten tributaries identified for work in this project will regain productivity again once passage and screening is provided. **Passive restoration is not a feasible option**, because human-built and maintained barriers preclude the opportunity. Construction of fishways and screens is required to regain safe passage.

Previous work related to this proposal includes a survey of migration barriers and unscreened diversions in the lower Wilson Creek watershed, conducted by Amy

Houtakker and Scott Nicolai of the YIN (Draft). This report concluded that construction of five fishways and five irrigation screens would increase the amount of rearing and spawning habitat by at least eight miles (from 1.9 CM=s currently available, to over ten CM=S after construction). A grant application for \$10,000 has been awarded from the eastern Washington Regional Fisheries Enhancement Group to complete the conceptual design engineering for the fishways. The YIN will cost-share this amount with funds approved for the first year of this proposal, to complete engineering work for fishway construction in all of the tributaries. Once the fishways are designed, efforts will quickly begin to commence construction in the lower portion of the Wilson watershed.

Work is also being done to restore anadromous access to Spring Creek under BPA project #9705200 "Enhancement between Selah and Union Gaps". That effort was undertaken on private property with full support of the landowner. Lessons learned will help in implementing this project.

The proposed work is a logical component of the *Wy-Kan-Ush-Mi Wa-Kish-Wit*, the Yakima Subbasin Plan, the Yakima River Watershed Council=s 20/20 plan, and the 1994 Fish and Wildlife Program, because the project strives to put the fish back into the habitat. The project also intends to protect the most productive habitat in the reaccessed tributaries.

b. Rationale and significance to Regional Programs

As stated in 8.a., under current conditions in the Yakima Subbasin, rearing habitat in the mainstem is sharply compromised because of irrigation delivery-related impacts on the hydrograph. At the same time, in the tributaries identified for work under this project, irrigation structures have formed upstream migration barriers, reducing the amount of rearing and spawning habitat from hundreds of miles to a mere eleven miles. Juvenile fry/parr densities below the lowest barriers are often extremely high relative to other portions of the basin. It is thus hypothesized that construction of fishways and irrigation screens to restore access to more than 100 miles of habitat would be extremely beneficial to juvenile survival.

The primary objectives of this project are to:

1. **provide access to productive tributary habitat** through removal of illegal barriers, consolidation of diversions, and construction of fishways and irrigation screens; and,
2. **protect the most productive habitats** within the project area through conservation easement and property purchase, and through fencing.

Accomplishing these objectives will tremendously increase the amount of available tributary habitat. Rearing habitat in the tributaries is not influenced by the summer-long, artificially high flows in the mainstem. Tributary habitat is often more thermally-benign in

the winter months (author, personal observation). The hypothesis that will be tested through this project is whether the ratio of adult recruits per spawner will increase if access to tributary habitat is significantly increased.

This project will further the goals of the Fish and Wildlife Program (FWP), through protecting at-risk, highly productive habitat, and through restoring migratory access to productive tributary habitats. At section 7.6, the FWP states: A wild and naturally spawning populations of salmon and steelhead are generally at low levels throughout the Columbia River Basin as a result of impaired mainstem passage, **blocked habitat**, habitat degradation...≡(emphasis mine). Later in the same section, the FWP states:

A However, maintenance and recovery of anadromous fish resources will not be possible unless dramatic steps are taken to **protect existing high quality habitat**, improve the quality of degraded habitat, **and increase the quantity of presently blocked habitat that could be made accessible...** "Habitat has decreased by **more than a third...**" (emphasis mine).

Under section 7.6A, the FWP states that the goals for rebuilding Columbia River salmon stocks include:

"At a minimum, maintain the present quantity and productivity of salmon and steelhead habitat. Then, improve the productivity of salmon and steelhead habitat critical to recovery of weak stocks. Next, enhance the productivity of habitat for other stocks of salmon and steelhead. Last, provide access to inaccessible habitat that has been blocked by human development activities."

This project will increase the amount of spawning/rearing habitat from eleven miles **to well over 100 miles of productive habitat**. These tributary habitats could become excellent rearing habitats again, as they were historically.

This project fits well with other habitat and fish production efforts ongoing in the basin. Countless hours and an estimated \$64 million has been spent (to date) on the Yakima Klickitat Production Facility, now in place in Cle Elum. That facility strives to rebuild **naturally spawning populations** of anadromous fish.

The project focuses strictly on protecting and restoring access to tributary habitat. Of 17 tributaries surveyed in the agricultural zone of the Yakima subbasin, all had extreme passage limitations or full barriers near the mouth because of diversion structures and/or instream flow problems. No tributaries exist in the study reach that did not exhibit at least one of these problems. In that ongoing fish recovery efforts strive to rebuild natural-spawning populations, and in consideration of the highly-compromised nature of rearing habitat in the mainstem, reestablishing tributary passage would provide much benefit toward achieving anadromous fish restoration goals.

c. **Relationships to other projects**

This project is a complement to project #9006900, the Yakima Hatchery, which strives to rebuild **naturally spawning/rearing** stocks of anadromous salmonids. To date, over \$64

million has been dedicated to the hatchery project. Reestablishing passage into tributaries is critical to the success of the hatchery, because only 5% of the historic habitat is presently accessible in the target tributaries. The intent to rebuild natural runs obligates fish managers to reestablish access into these habitats.

This project is a logical progression from BPA project #96FC96064, the Wilson Creek Riparian Zone Restoration Project, which strives to demonstrate that productive salmon habitat can coexist with viable agriculture. To date, mostly on private land, 8,000 plants have been sown on over four miles of shoreline, a survey of the migration barriers and unscreened diversions in the lower 20 miles of the watershed has been completed, and several influential private landowners are now familiar with and support the project's objectives. The barrier survey will be instrumental in completing this project's year #1 tasks. The findings of the passage survey will be circulated to 17 landowners, and any others who request the report.

Another complementary YIN riparian restoration project was implemented in 1995-96, in the Cowiche Creek watershed. This project was funded through the Environmental Protection Agency with Clean Water Act Section 319 funds. Again, demonstrating the benefits of maintaining riparian habitat on agricultural land was the goal. Through this project, habitat restoration/protection occurred on 15 private parcels. Meetings were conducted with 40 landowners. A total of twelve presentations were given to the following groups: local science teachers (through the Education Service District), the Yakima Chapter of the Cattlemen's Association, the local Cowiche Creek landowners (public meeting), the Yakima County Weed Board, the Yakima River Basin Watershed Council (YRBWC) Water Quality Committee and the Executive Committee, the Mission Brender Yaxsum Watershed Group, the Cowiche Canyon Conservancy annual meeting, the Cowiche Canyon Conservancy Earth Day Hike (two consecutive years), the Yakima Greenway Foundation Earth Day, and the Ellensburg Rotary Club. In addition, the Cowiche project was highlighted at two riparian restoration workshops, one hosted by the Yakama Nation and another by the Chelan County Conservation District. Informal presentations were given to school field trip groups as well. At the end of the project, an instructional manual was created and given to interested landowners. (Cowiche Creek Riparian Zone Restoration Project, Final Report)

Fish habitat management has received news coverage and public support through the riparian and hatchery projects. However, educating private landowners about the benefits of healthy riparian habitat will have little effect on anadromous fish populations if the fish cannot access the habitat. The Wilson Creek watershed includes roughly one hundred miles of habitat, but today only the lower six miles can be accessed by chinook salmon and steelhead. Cowiche Creek historically provided about 25 miles of anadromous habitat, but present irrigation structures have completely eliminated upstream juvenile passage, and have sharply reduced adult passage for spring chinook and coho.

Project #9705200 of the BPA titled A Enhancement Between Selah & Union Gaps may affect passage in the extreme lower end of Wide Hollow Creek, and Blue Slough, two of

the 10 streams targeted in this proposal. Passage into Spring Creek will also be restored through that project. However, the primary aim of that project is habitat acquisition within a braided section of the Yakima mainstem, thus it is unlikely that significant passage improvements will be made without funding under the tributary project.

d. Project history (for ongoing projects)

Funding was awarded in November, 1998, thus no work has been conducted to date. However, as mentioned in section 8.c, earlier work under another BPA-funded project has set the stage to implement this project.

e. Proposal objectives

Objectives of this project include:

1. Reestablish migratory access for juvenile and adult anadromous salmonids to over eight miles of habitat in lower Wilson Creek.
2. Conduct field surveys to map, measure, photograph and describe migratory barriers and unscreened diversion in ten tributaries in the Yakima subbasin.
3. Complete a report of the conclusions from the barrier and diversion surveys. Circulate the draft for peer review. Circulate the final to interested parties.
4. Formulate a construction plan to remedy passage problems. Develop recommendations based upon cost/benefit analysis'.
5. Construct fishways at migration barriers, and reliable screens at gravity-fed diversions in ten tributaries, to regain over 100 miles of tributary habitat.
6. Protect into perpetuity the most productive riparian and instream habitats in the reaccessed habitats conservation easement purchase and property purchase. Protect habitat from grazing impacts through fencing. Property appraisals have not been conducted, but the cost is expected to be approximately \$2500 per acre.
7. Monitor the results of fishways and irrigation screen construction.
8. Prepare quarterly reports to be submitted to BPA.

Products of this project include:

1. A report detailing the location, description and number of migration barriers and unscreened diversions in ten Yakima subbasin tributaries.
2. Structures that provide migratory access for juvenile and adult anadromous salmonids, in all tributaries deemed economically feasible for fixing.
3. Irrigation diversion screens to provide safe access to tributaries, by preventing entrainment into irrigation ditches.
4. Conservation easements and property acquisition on habitats with high functional value.
5. Fencing to protect riparian habitat from improper grazing.
6. Quarterly reports on project efforts and results, including number of miles of tributary rearing habitat that is regained through the fishway/screening and habitat protection efforts.

f. Methods

The vast majority of the habitat in the ten candidate tributaries has been lost over the last 140 years due to irrigation development. A critical project assumption is that restoring access to as much tributary habitat as is feasible (based upon the findings of the barrier reports completed in year #1) will result in greater fish productivity in the entire watershed. Reconnected habitat will be recolonized through migration from the mainstem. Thus another critical assumption is that these juvenile fish will move upstream into these habitats, and that adult fish will stray into the same. These last two assumptions are supported by local evidence; the Yakima Species Interaction Study has found Yakima mainstem-spawned juvenile fish that moved roughly 20 kilometers up associated tributaries where barriers were not present.

The function of fishways and diversion screens will be tested through snorkel, beach seining, and redd surveys. Project efficacy may be tested through statistical analysis conducted to determine egg to smolt survival with outmigration data gathered at the Chandler juvenile fish handling facility. However, it is important to note that other supplementation efforts currently underway in the basin will complicate monitoring in the larger watershed.

Tasks for each objective include:

- Objective 1: Reestablish juvenile chinook passage in lower Wilson Creek.
 - Task 1a: Subcontract engineering work, to be cost-shared with pre-approved funding from the eastern Washington Regional Fisheries Enhancement Group.
 - Task 1b: Seek additional cost-share funding for fishway/screen construction from the BOR, the USFWS, and the Natural Resources Conservation Service.
 - Task 1c: Construct a total of five fishways and five irrigation diversion screens, to regain access to at least eight miles of habitat.

- Objective 2: Conduct field surveys to map, measure, photograph and describe migratory barriers and unscreened diversion in ten tributaries in the Yakima subbasin.
 - Task 2a: Collect maps and ownership information, formulate data sheets.
 - Task 2b: Obtain permission to access private properties.
 - Task 2c: Conduct field surveys.

- Objective 3: Complete reports on the conclusions from the barrier and diversion surveys.
 - Task 3a: Develop draft tributary barrier reports, circulate for peer review.
 - Task 3b: Circulate final reports to other fish managers and irrigation district personnel.

- Objective 4: Formulate action plans to remedy passage problems. Develop recommendations based upon cost/benefit analysis from the survey reports.
- Task 4a: Run calculations from findings of report, on cost per unit habitat gained for rectifying problems in individual reaches within each tributary.
- Task 4b: Collect input from other fish managers on findings of the report and the calculations.
- Task 4c: Finalize fishway and screen construction plan, based on calculations, input from other fish managers, and biological criteria, including proximity in the watershed, habitat conditions in the subject tributary, access concerns from the mainstem and water quality in the tributary.
- Objective 5: Construct fishways at migration barriers, and reliable screens at gravity-fed diversions, to regain more than 100 miles of tributary habitat.
- Task 5a: Secure all applicable permits.
- Task 5b: Draft statements of work, circulate to contractors, request bids from same.
- Task 5c: Receive bids; award contract(s).
- Task 5d: Begin construction.
- Objective 6: Protect, into perpetuity, the most productive riparian and instream habitats in the reaccessed habitats through conservation easement and property purchase. Protect habitat from grazing through fencing.
- Task 6a: Develop tentative list of purchases and fencing projects based upon risk of permanent habitat loss, and current/potential habitat function.
- Task 6b: Contact landowners to solicit involvement, based upon willing seller-willing buyer approach.
- Task 6c: From list of interested sellers, develop MOA's with each to initiate the appraisal and hazardous materials assessment process.
- Task 6d: Compare funding limitations to amount of potential habitat to acquire under different scenarios.
- Task 6e: If necessary, conduct Habitat Evaluation Procedures to prioritize parcels for purchase.
- Task 6f: Finalize purchases and construct fences.
- Objective 7: Monitor results of constructing fishways and screens.
- Task 7a: Conduct snorkel, beach seine, or electrofishing surveys in treated tributaries, utilizing mark/recapture population survey methodologies.
- Task 7b: Conduct redd surveys in treated tributaries.
- Task 7c: If appropriate, conduct statistical analysis on smolt outmigration numbers at the Chandler juvenile facility to attempt to quantify project benefits.
- Objective 8: Document progress of project
- Task 8a: Prepare quarterly reports, forward to BPA and other interested parties.

g. Facilities and equipment

The project will utilize the existing YIN fisheries office building. Vehicles will be leased through GSA. Typical field equipment is available through the YIN fisheries program. No special or high-cost equipment will be required.

h. Budget

Subcontracting is for construction of 10 fishways and 15 irrigation screens, at an average cost of \$20,000 per structure. The funds for conservation easements and fee simple purchase are expected to provide permanent protection of 40 acres of sensitive habitat. Personnel have been reduced from 2.0 FTE's in FY99 to 1.0 FTE in FY2000 and beyond, because field surveys, reporting and construction plans should be finalized by the beginning of FY2000.

Section 9. Key personnel

The primary contact for the project is Scott Nicolai, Assistant Environmental Manager, YIN Fisheries Resources Program. Duties will include personnel hiring and project oversight. Qualifications include Masters Degree in Natural Resources Management, seven years experience working in the field of fisheries habitat management, project oversight on five large habitat restoration projects and numerous small projects. Current employer is the Confederated Tribes and Bands of the Yakama Indian Nation. Job completions include the Cowiche Creek Riparian Zone Restoration Project, the lower Wilson Creek barrier/diversion survey report, the Brunson bioengineering bank stabilization and riparian habitat restoration project, and the Teanaway Junction Side Channel enhancement project. Additional ongoing job requirements include oversight of BPA project #9705100 – “Yakima Side Channels”, BPA project #96FC96064 – “Wilson Creek Riparian Zone Restoration Project” BPA project #9705200 - AEnhancement Between Selah & Union Gaps and review and comment on SEPA documents, NEPA documents, Shoreline, Hydraulics and 404 permits, and Growth Management Act Plans. Also tracks and provides technical input to local Watershed Councils.

Several other YIN fisheries personnel will contribute to the completion of this project. Paul Ward, Environmental Manager, holds a Juris Doctorate degree and will assist with water rights issues. Le Roy Adams Jr., Watershed Restoration Specialist, has extensive experience in contracting and heavy equipment use and will advise as necessary.

Inasmuch as the project has substantial support from the Washington Department of Fish and Wildlife, much coordination will occur with that agency. Personnel involved in the project from WDFW will include John Easterbrooks, who coordinates the screening program for eastern Washington. Perry Harvester and Brent Renfrow, area habitat biologists for Yakima and Kittitas Counties respectively, will provide guidance as needed.

Section 10. Information/technology transfer

The technical information resulting from this project (and its component tasks) will be distributed in the following ways:

- ! A completion (annual) report will be submitted to Bonneville at the close of the fiscal (calendar) year and Bonneville will distribute copies to all individuals and agencies on its mailing list.
- ! Excerpted data will be appropriately formatted and submitted to the Northwest Aquatic Information Network (StreamNet) and made available to the public via the Internet.
- ! Community Atown hall≡ type meetings will be held as deemed necessary in areas near where work is proposed.
- ! **Barrier surveys will be circulated via internet and traditional mail to other fish managers, the Yakima Basin Watershed Council and Irrigation Districts in the Yakima subbasin.**

Congratulations!